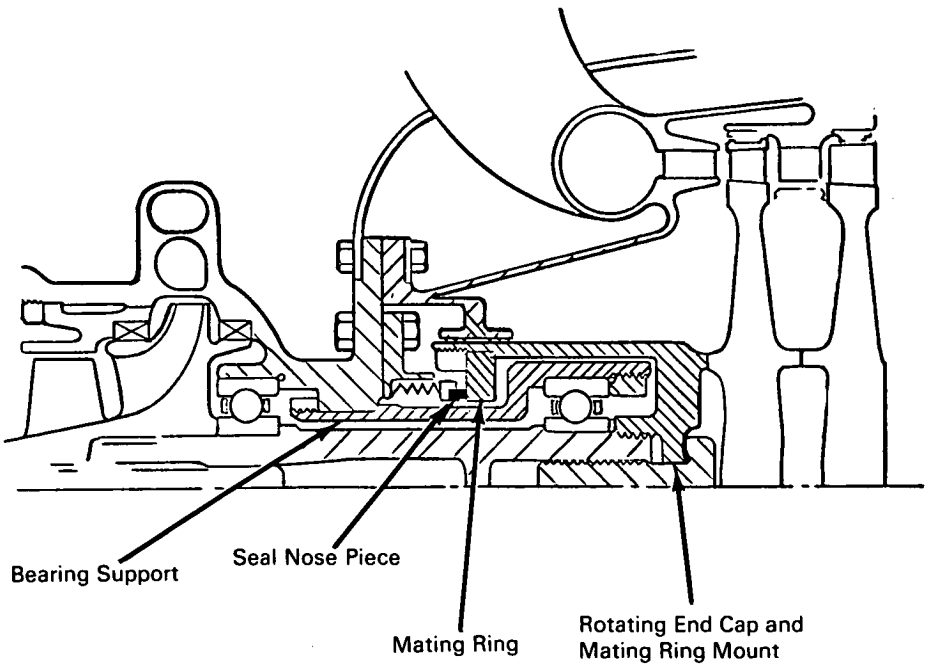
AEC-NASA TECH BRIEF

Between-Bearing Shaft Seal, A Concept



Presently used seal configuration for oxidizer pumps consists of a nose-rubbing shaft seal followed by a double shaft-riding seal with an intermediate purge. The seals are now overhung from the turbine end bearing with a resultant large turbine shaft overhang, a condition that multiplies vibration problems as shaft speed increases.

The solution is to place the seal assembly between the bearings to reduce the shaft overhang length and overall turbopump length. A rotating end cap is placed around the turbine end bearing to prevent leakage into the turbine and to support the mating ring. The end cap also acts as a support for a mating ring located between the pump bearings. The turbine end bearing is supported by a sleeve of smaller inside diameter than the mating ring and passes inside the mating ring. The nose-riding seal is located between the bearings, which are lubricated by the pumped fluids. The shaft seal leakage gas is separated from the turbine gases by a double labyrinth seal that incorporates an intermediate purge and is located at the outside diameter of the rotating cap.

Notes:

1. This arrangement would remove the seals from the hot turbine region and result in a significant reduction in turbopump overall length.

(continued overleaf)

2. This development is in conceptual stage only, and, as of date of publication of this Tech Brief, neither a model nor prototype has been constructed.

Patent status:

No patent action is contemplated by NASA.

Source: R. B. Furst
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